









# Joshua Feinglass

I'm a Founder and Principal Investigator at Green Squirrel Research developing **generalizable** and **robust** models for the deployment of safe and reliable AI systems. I received my PhD in Computing Engineering (specialized in Machine Learning) from Arizona State University in December 2024.

During my PhD studies, I worked in the [ASU APG](#) lab where I was advised by Yezhou Yang. I interned at  Microsoft Research, where I developed novel datasets, machine learning models, and benchmarks for forecasting and analyzing cybersecurity incident escalation, and  Lawrence Livermore National Lab, where I developed a novel zero-shot deep learning architecture using image and natural language data sources. Prior to pursuing my Signal Processing/Machine Learning specialized Master's degree in 2016, I also interned for two summers at **Honeywell** where I worked on web development, test automation scripts, electrical component diagrams, and hardware programming.

After receiving my Master's degree, I worked full-time as a Senior Digital Signal Processing Engineering at  General Dynamics where I designed algorithms for spectral decomposition, detection, characterization, and classification of communication and radar signals before pursuing my PhD.

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 Google Scholar  
 Curriculum Vitae (PDF)

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## Education

Aug. 2019 — **Ph.D. in Computer Engineering w/ Machine Learning Specialization**  
Dec. 2024 Arizona State University, Tempe, AZ  
Committee: Yezhou Yang (Advisor), Gautam Dasarathy, Angelia Nedich, Daniel Bliss  
University Graduate Fellowship awardee  
Best Paper Award at CVPR 2024 VDU Workshop

Aug. 2016 — **M.S. in Computer Engineering w/ Machine Learning Specialization**  
May 2018 Arizona State University, Tempe, AZ  
GPA: 3.93/4.00

Aug. 2012 — **B.S. in Electrical Engineering**  
May 2016 Arizona State University, Tempe, AZ  
Barrett, the Honors College Graduate  
Electrical Engineering Student Mentor  
GPA: 3.85/4.00

## Work and Research Experience

Nov. 2023 — **Green Squirrel Research**, Huntsville, AL (Remote)  
Present *Founder/Principal Investigator, AI at GSR*  
Leading and conducting research for start-up specialized in machine learning and artificial intelligence for computer vision and natural language processing. Spearheading three separate product research and development efforts in robust extraction/search/encapsulation of documents and their tables/figures, segmentation and characterization of projectiles and ignition events in ballistic experiments, and first-principles energy prediction in manufacturing with Large Language Models (LLMs).

May 2023 — **Microsoft Research**, Redmond, WA  
Aug. 2023 *Research Intern, Augmented Learning and Reasoning*  
Mentor: Jack (Jay) Stokes, Scott Freitas  
Developed novel datasets, machine learning models, and benchmarks for forecasting and analyzing cybersecurity incident escalation. Further explored potential implementation options and use cases to demonstrate feasibility and product impact, respectively.

May 2022 — **Lawrence Livermore National Lab**, Livermore, CA  
Dec. 2022 *Graduate Research Intern, Computing at LLNL*  
Mentor: Jayaraman Thiagarajan, Rushil Anirudh, Jayram Thathachar  
Developed a highly generalizable Zero-Shot Learning architecture with pre-trained vision pipelines, automated external knowledge retrieval from natural language sources, and model regularization techniques.

May 2018 — **General Dynamics Mission Systems**, Scottsdale, AZ  
Dec. 2019 *Senior Digital Signal Processing Engineer, Trusted Space Solutions*  
Created specifications for the standard operation and packet-level communication of devices in an edge computing framework. Developed algorithms for detecting communication and radar signals of interest and estimating their time and frequency characteristics for downstream decoding, classification, and localization tasks. Automated and optimized the creation of data compression pipelines for efficient communication channels and downstream data visualization tasks based on project requirements.

Jan. 2020 — **Arizona State University**, Tempe, AZ  
Dec. 2024 *PhD Researcher, Active Perception Group*  
Mentor: Yezhou Yang  
Explored concepts like knowledge representation/extraction, model generalization/robustness, and inference consistency/evaluation in Natural Language and Image Processing applications. First author of a novel information theory based evaluation of captions for semantics and fluency presented in ACL 2021, outlier detection/uncertainty estimation using domain interpolation based sensitivity analysis presented as a spotlight presentation in the NeurIPS 2022 INTERPOLATE workshop, an object detection

work which introduces and addresses upstream and downstream task misalignment by computing object importance scores using semantic modeling and graph signal processing presented at WACV 2024, and an algorithm for detector-based object part enhancement in fine-grained zero-shot image captioning presented in EMNLP 2024 Findings.

Jan. 2017 —

**Arizona State University**, Tempe, AZ

Dec. 2017

*Master's Research Assistant, Image, Video, and Usability (IVU) Lab*

Mentor: Lina Karam

Built software frameworks using C, Python, OpenCV, Ada, and Matlab on a Linux platform for data acquisition and signal processing on the Soli radar device. Developed biometric and gesture detection/estimation algorithms using machine learning, sensor fusion, feature point tracking, beamforming, spectral analysis and pattern recognition algorithms on Photoplethysmographic (PPG) and Frequency-Modulated Continuous-Wave (FMCW) signal information.

May 2016 —

**Honeywell**, Phoenix, AZ

Aug. 2016

*Intern, Test Services*

Mentor: Craig Stevens, Bob Apodaca

Modified and updated PHP/HTML/CSS/JavaScript/Fusebox based web applications and tested any changes using a Debian VM. Created and restructured Perl scripts, Ladder Logic Programs (PLC), and other software programs used for Test Cell support. Implemented revisions to existing AutoCAD Electrical designs and developed a strain-gauge specimen box to fulfill the electrical and mechanical requirements of a work request from another department.

May 2015 —

**Honeywell**, Phoenix, AZ

Aug. 2015

*Intern, Test Services*

Mentor: Craig Stevens, Bob Apodaca

Modified and updated PHP/HTML/CSS/JavaScript/Fusebox based web applications and tested any changes using a Debian VM. Created and restructured Perl scripts, Ladder Logic Programs (PLC), and other software programs used for Test Cell support. Implemented revisions to existing AutoCAD Electrical designs and developed a strain-gauge specimen box to fulfill the electrical and mechanical requirements of a work request from another department.

## Publications

### **Towards Modeling the Implicit Ontologies of Natural Language for Vision-Language Benchmarks**

Joshua Feinglass

*Arizona State University (Dissertation). 2024.*

[Project](#) [BibTeX](#)

### **TROPE: TRaining-Free Object-Part Enhancement for Seamlessly Improving Fine-Grained Zero-Shot Image Captioning**

Joshua Feinglass, Yezhou Yang

*Findings of the Association for Computational Linguistics: EMNLP 2024 (EMNLP Findings). 2024.*

[Project](#) [BibTeX](#)

## 'Eyes of a Hawk and Ears of a Fox': Part Prototype Network for Generalized Zero-Shot Learning

Joshua Feinglass, Jayaraman J. Thiagarajan, Rushil Anirudh, T.S. Jayram, Yezhou Yang  
*CVPR 2024 Workshop on Representation Learning with Very Limited Images (CVPR Workshop)*. 2024.

[Project](#) [BibTeX](#)

## Grounding Stylistic Domain Generalization with Quantitative Domain Shift Measures and Synthetic Scene Images

Yiran Luo, Joshua Feinglass, Tejas Gokhale, Kuan-Cheng Lee, Chitta Baral, Yezhou Yang  
*CVPR 2024 Workshop on Vision Datasets Understanding (CVPR Workshop)*. 2024.

[Project](#) [BibTeX](#)

## Towards Addressing the Misalignment of Object Proposal Evaluation for Vision-Language Tasks via Semantic Grounding

Joshua Feinglass, Yezhou Yang  
*Proceedings of the IEEE/CVF Winter Conference on Applications of Computer Vision (WACV)*. 2024.

[Project](#) [BibTeX](#)

## Covariate Shift Detection via Domain Interpolation Sensitivity

Tejas Gokhale\*, Joshua Feinglass\*, Yezhou Yang  
*NeurIPS 2022 Workshop INTERPOLATE (NeurIPS Workshop)*. New Orleans, LA, 2022.

[Project](#) [BibTeX](#) \* Authors contributed equally

## SMURF: SeMantic and linguistic UndeRstanding Fusion for Caption Evaluation via Typicality Analysis

Joshua Feinglass, Yezhou Yang  
*Proceedings of the 58th Annual Meeting of the Association for Computational Linguistics (ACL)*. Online, 2021.

[Project](#) [BibTeX](#)

## Talks

### Characterizing and Mitigating the Misalignment Between the Evaluation of Generative Models and their Intended Use Cases

Jan. 2024 Invited Talk for the Reliability of Generative Models in Vision Tutorial at WACV 2024

### Predicting the Evolution of Cybersecurity Incidents

Aug. 2023 Microsoft Research (Redmond)

### Covariate Shift Detection via Domain Interpolation Sensitivity

Dec. 2022 NeurIPS 2022 Workshop INTERPOLATE

### Recognizing Unseen Classes with Part-Whole Prototypes

Aug. 2022 Summer SLAM at Lawrence Livermore National Lab

**Identifying Features of Out-of-Distribution Examples and their ties to Improved  
Evaluation of Generation Tasks**

Apr. 2022

Cognition and Intelligence Lab at ASU

**SMURF: SeMantic and linguistic UndeRstanding Fusion for Caption Evaluation via  
Typicality Analysis**

Aug. 2021

ACL 2021